

THE glowing sunsets having reappeared, though far less brilliant than in November and December last, I send you a list of the most remarkable of them which have been noticed at Clairvaux, in the Department of Aube. They appeared with the same features as have been so often described in NATURE, and were especially glowing on the following days:—November 25, 27, 28; December 12; January 7, 12; August 6, 22 (feeble, sky not quite bright), and 23 (more brilliant); September 10 (feeble, bright sky, beautiful pink coloration in the east) and 17 (bright sky, bright pink coloration one hour after sunset). When the sky is bright, the rise of the moon is preceded, for nearly one hour, by a bright illumination of the sky.

Clairvaux, Aube

P. K.

FOR the last four evenings, the 15th, 16th, 17th, and 18th, and again to-night, the colour of the sky from 20 to 25 minutes after sunset has taken that deep magenta glow looking very like the effect of a great fire, only lighter in tone. Last night, the 18th, this lasted until after 7 o'clock, and stars were then shining through it as they do through an aurora.

The reappearance of these glows was to be expected, as the haze and ruddy glow about the sun by day has, so far as I have been able to see, never really been long absent since attention was first drawn to it last autumn. I have now received a letter from Sydney, dated July 24, in which the writer says: "Since we have been in the Southern Hemisphere the sunsets have certainly had more striking colours, and on many occasions I have seen that peculiar magenta or mauve tint in the sky like aurora, only bluer in colour, while the sky has been very white just before sundown." The writer of the above is used to the look of the sun and sky, being an officer on board a mail steamer. I had suspected that absence of colour more or less in the sunsets here during our summer might be owing to the position of the sun rather than to any diminution in the quantity of vapour in the higher atmosphere, and had asked the writer of the above to note as he went south, in their winter, whether there was any increase in the colour of the after-glows, &c., being led to think this might be the case from reading the report of Mr. Neison, Director of the Natal Observatory, in which he speaks of having "first observed these phenomena in February 1883, from which time they increased in intensity until June, after which there was an interruption until the month of August." This led me to expect a return of strongly marked colour in our after-glows in autumn, increasing probably in intensity and duration during our winter months, when the weather is clear enough to see the sky.

ROBT. LESLIE

Moirs Place, Southampton, September 19

The Diffusion of Species

THE vast and altogether exceptional assemblage of Salpæ mentioned in NATURE (September 11, p. 462) by the Duke of Argyll as having been observed by him whilst recently cruising in the Hebridean seas, was due, in all probability, to the extension in a north-easterly direction of the ordinary surface-current of the Atlantic, or to an unusually long continuance of steady south-westerly wind, the effect of which would be to drive the superficial water of the Atlantic before it to the British coasts, and, with the water, the enormous multitudes of Salpæ which are occasionally to be met with in the latitude of the Canaries and Cape Verd Islands.¹

During voyages to and from Bengal, *via* the Cape, in the good old days of sailing vessels, I repeatedly came across vast aggregations of these creatures; my attention having been specially called to them whilst engaged as I generally was for many hours by night as well as by day, in using a towing net from the stern ports for the capture of natural history specimens.

On my last voyage from Bengal in 1857 the ship sailed through some fifty or sixty miles of what the Duke aptly describes as Salpa soup, and which looked exactly like boiled tapioca. The quantity of Salpæ present in a bucket of the sea-water was, at least, equal in volume to the volume of water, but then the bodies of the Salpæ themselves consist in reality of more than 90 per cent. of water. On the occasion referred to, almost the entire mass consisted of a small species of Salpa about an inch in length, but nevertheless large enough to render the bright

yellow digestive cavity of each, which is about the size of the smallest pin's head, distinctly visible. This was invariably full of certain species of oceanic diatoms the endochrome of which imparted the yellow colour. It is worthy of remark that in the case of the Salpæ, as well as many other organisms holding a yet lower position in the animal scale, there undoubtedly exists a selective power which enables them to pick out certain kinds of food in the midst of a superabundance of different kinds.

In the tropical Atlantic and Indian Oceans also I have seen, during calms, immense numbers (though not to be compared with the gatherings of the smaller Salpæ) of the larger chain Salpæ. These sometimes attain a length of from 8 to 10 inches, and have stomachs as large as a good-sized marble or hazel-nut.

But the most interesting assemblage of the lower forms of pelagic life was noticed by me about 200 miles from Ceylon, during a dead calm of four days' duration, when the sea was as smooth as a mirror, and undisturbed save by its never-ceasing majestic swell. Deep down, as far as the eye could penetrate, were to be seen numbers of brightly coloured water-snakes, delicately tinted "Venus's girdles," "Velellæ," and countless multitudes of those more minute living things which, though barely visible as mere specks to the unaided vision, are full of beauty and interest when observed under the microscope. Such a calm is a veritable pandemonium to the "skipper,"—to the naturalist it is a paradise.

G. C. WALLICH

September 14

I AM specially interested in the Duke of Argyll's letter on the above subject (p. 462), being a resident during nearly half the year in the most southern of the Hebrides. His Grace is so competent a naturalist, and so accurate an observer, that I assume at once he had evidence which satisfied himself that an adder swam from Mull to Iona. Still I must be pardoned if I say that your readers have not been supplied with the proofs which have satisfied his Grace. A boy and girl in Iona, who, I presume, had never seen an adder in their lives, killed a creature in the sea there. Might it not have been an eel?

As regards distribution of species I may mention the following. In this island (Islay) we have multitudes of *stoats* but not a single *weasel*, while I am informed on trustworthy authority that in the neighbouring island of Colonsay there are many weasels but not a single stoat.

R. SCOT SKIRVING

Sunderland House, Islay, September 18

Shifting of the Earth's Axis

IN the very interesting address of Prof. Young (NATURE, September 18, p. 501) he refers to the variability of the earth's axis, and states that a change of 1" per century has been detected at Pulkowa, but that "the Greenwich and Paris observations do not show any such result." Now only last year, in the "Pyramids and Temples of Gizeh," I had (p. 126) noted that the Greenwich observations *did* appear to show a change, and that a change of the same amount and same direction as is stated by Prof. Young for Pulkowa; the observations of this century showing a decrease of 1" of latitude per century, or with those of Maskelyne a decrease of 1".38 per century.

This change I adduced as corroborating the result shown by four very accurate orientations of the earliest buildings, the Gizeh pyramids. These structures, whose errors are but a few seconds of angle, agree in standing as much as 4' or 5' to the west of the present north. This would imply a change of about 5" or 6" per century in the direction of long. 120°; a result quite comparable to the motion of 1" or 1".4 per century in long. 0° and 30°. Such a change might be effected by causes which are beyond our observation; as, for instance, unbalanced ocean circulation equal to a ring of water only 4 square miles in section moving at a mile an hour across the poles. If this motion of 6" per century in long. 120° is still in action, we might now expect to find a change of about 5" in the meridian determined at the beginning of the Ordnance Survey, a ground of observation which should not be neglected.

W. M. FLINDERS PETRIE

Bromley, Kent

Salmon-Breeding

MR. FRANCIS DAY'S interesting communication last week (p. 488) on this subject is likely to attract more attention from biologists and pisciculturists than any other recently-ascertained fact in the natural history of the Salmonidae, and it opens the large ques-

¹ As is well known, vast assemblages of Salpæ and kindred forms constantly occur at the surface in Arctic and Subarctic seas, during the prevalence of moderate weather.

tion how the migratory instinct became established in certain members of the family, when it appears not to be physiologically indispensable to them. At the period of migration, when the smolts are fit to go to the sea, they evince, I believe, the utmost restlessness (like all migratory animals), and frequently leap out of the fresh water in which they are confined, and die on the banks. This has taken place year after year in the nursery ponds on the Plenty River, Tasmania, where it was first placed beyond question that a migratory salmonid could remain and breed perfectly freely year after year in fresh water. On January 20, 1866, Mr. J. A. Youl, C.M.G., sent out to Tasmania a consignment of salmon, salmon-trout, and brown trout (*S. fario Ansonii*). On June 25, 1869, several parrs of the salmon-trout, then weighing in some instances more than a pound, were busy nesting, the result being that many thousands of fry from their ova were subsequently sent to stock other rivers. The imprisoned salmon-trout have continued to breed for several years in succession, but there has been noticed in them a tendency to become sterile as they grow older. There is also some reason to believe that *Salmo salar* has bred in the ponds on the Plenty. Two young specimens which, from certain circumstances, the Commissioners believed to be true salmon, were sent to Dr. Günther for examination, with full information as to their origin and history; and he, while expressing his reluctance to give a decided opinion, stated that they "presented all the anatomical characters of *S. salar*." Full details of the breeding in fresh water of *S. trutta* will be found in "The Acclimatisation of the Salmonidæ at the Antipodes—its History and Results." ARTHUR NICOLS

A Sea Monster

A FRIEND of mine, Capt. W. Hopkins, of the schooner *Mary Ogilvie*, who has just returned from a voyage all round Australia, has given me the following information, which I forward you for publication, not so much because of its interesting character, but in order that other travellers may throw some light upon the character of the animal, which, if an Octopus, must be of much larger dimensions than those usually met with. On June 15, when in S. lat. $21^{\circ} 37'$ and E. long. $113^{\circ} 49'$, about five miles off the Exmouth Gulf on the western coast of the continent, he saw an immense creature which he took to be a species of Octopus. His attention was drawn to it by a perfect cloud of sea birds, and at first he naturally thought it must be a dead carcass. On approaching it, however, he found it was alive, and sluggishly disporting itself. In shape it was like a violin, but of immense size, with some six feelers about the greater diameters of the violin. It lay almost flat upon the water, was of a dark gray above and lighter gray below, and was continually elevating one of its feelers, apparently twice the thickness of a man's arm, to a height of from six to eight feet. It appeared to be vomiting, and as the birds were evidently feeding, that accounted for their presence in such numbers. Its size was so great that, had it grasped the vessel, it could easily have capsize it. The captain therefore got out of the way as quickly as possible, and without making definite measurements; but a large whale in the vicinity looked quite diminutive. It is a pity that something more exact as to size is not available, but I think the description is sufficient to convey an idea of the nature of the monster. All along the northern and western coasts of the continent vast shoals of pumice, in portions varying in size from ordinary gravel to about a foot in diameter, and completely covered with barnacles, were passed through.

Sydney, N.S.W., August 4

ALFRED MORRIS

Hail

WILL any of your readers kindly oblige me with particulars of the formation of a hailstone, and the effect produced upon it by falling through the air. How does it become frozen? increase in size? and what are the conditions for its increase? up to what point in its passage does it increase? what effect has temperature upon it in its downward career? after a certain point in its fall should it not theoretically decrease in size? does it do so actually? how is it that larger stones generally fall in tropical or hot climates during thunderstorms than we witness during our English winters? Does a raindrop increase in size as it nears the earth? If so, please give reasons. A. D.

Lisbon, September 1

[The best account of the formation of hail is given in Ferrel's

"Meteorological Researches for the Use of the Coast Pilot," Part II. p. 85, a brief *résumé* of which is given in the "Encyclopædia Britannica," article *Meteorology*, p. 132.—Ed.]

THE "COMMA-SHAPED BACILLUS," ALLEGED TO BE THE CAUSE OF CHOLERA¹

WITH a view of studying the phase which the cholera question has now entered upon, in consequence of the publication of the results of the investigations of the German Cholera Commission in Egypt and India, I availed myself of the opportunity which the present vacation at the Army Medical School afforded of proceeding to Marseilles, where the disease has been prevalent since the end of June. Sir Joseph Fayrer was so kind as to enlist for me the valuable assistance of Dr. Le Roy de Méricourt, Médecin en Chef of the French Navy, who in various ways did his utmost to further my wishes. Dr. Marroin, the Chief of the Sanitary Department in Marseilles, was so good as to introduce me to the authorities of the Pharo Hospital, where the cholera cases are treated, and where, with the permission of the principal medical officer, Dr. Trastour, I was able to renew my acquaintance with the disease, and to collect material for studying afresh the microscopy of the intestinal discharges.

Before, however, referring to the results of my own observations, it will be convenient to epitomise the published history of the German Commission; to point out the salient features of the results of their investigations in Egypt and in India; and to make a few brief comments on such of the circumstances and conclusions as appear to call for notice. Shortly after the arrival of the Commission in Egypt, Dr. Robert Koch reported, on behalf of himself and his colleagues, that no special micro-parasites had been discovered in the blood, the lungs, the spleen, the kidneys, or in the liver in cholera, but that the intestinal mucous membrane was permeated by certain Bacilli which nearly resembled in size and form the Bacilli found in glanders. As is well known, these Bacilli are straight, and are, in fact, uncommonly like the ordinary microphytes associated with decay. Dr. Koch also states in connection with this subject that he had, previous to proceeding to Egypt, found similar Bacilli in the intestinal mucous membrane of four natives of India, but that he had then looked upon them as due to merely *post mortem* changes. When he came to Egypt, however, and found these same Bacilli in the intestines of perfectly fresh cases, he felt that an important link was furnished towards establishing the identity of the disease in Egypt with Indian cholera.

It is highly probable that the specimens from India which Dr. Koch had examined were those which were sent, at the request of the Imperial Health Department in Berlin, by the Sanitary Commissioner with the Government of India. These consisted of numerous dry cover-glass specimens of blood which I had collected from several cholera patients, and of portions of the viscera of four natives who had died of the disease. All these were examined by me before they were despatched, and portions of each were reserved for further study. I had heard nothing further of them, but the publication of the remarks above referred to in Dr. Koch's Report of September 17, 1883, from Alexandria, recalled them to my mind, and I was glad to infer that my own negative results had been confirmed in Berlin. As already observed, no importance had been originally attached to the organisms which were present in the intestinal mucosa. During the last six months I have examined hundreds of stained microtome-sections of these four, and of other specimens of cholera intestines in my possession, and have found that, when the mucosa is infiltrated with

¹ A Memorandum by Surgeon-Major Timothy Richards Lewis, M.B., Assistant Professor of Pathology, Army Medical School. Communicated by the Director-General, Army Medical Department.